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Effect of Structured Pre-Anaesthetic Review on Perioperative Complications: A Randomized Controlled Trial in Nigeria

Kabiru Salisu Zamau[1]*; Abdulrahman Salihu Kombo[2]; Saidu Yakubu[3]; D. K. Sani[4]; Hamisu Yakubu[5]

[1]Department of Nursing Services, Federal Medical Centre, Gusau, Nigeria
[2]Department of Nursing Sciences, Ahmadu Bello University, Zaria, Nigeria
[3]Department of Anaesthesia, Ahmadu Bello University Teaching Hospital, Shika-Zaria, Nigeria
[4]Department of Anaesthesia, Ahmadu Bello University Teaching Hospital, Shika-Zaria, Nigeria
[5]Faculty of Allied Health Sciences, Ahmadu Bello University, Zaria, Nigeria

Corresponding Author: Kabiru Salisu Zamau*

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Abstract: Pre-anaesthetic review is a critical component of perioperative care, but in many resource-constrained settings, it is often brief and informal. This study evaluated the effect of a structured pre-anaesthetic review (SPAR) on the incidence of perioperative complications among elective surgical patients. A randomized controlled trial was conducted at Federal Medical Centre, Gusau, Nigeria. A total of 114 adult patients scheduled for elective surgery were randomly assigned to an intervention group (SPAR, n=57) or a control group (routine care, n=57). Perioperative complications were assessed using the Clavien-Dindo Classification. Patients in the intervention group demonstrated significantly higher adherence to perioperative safety protocols (0.88 ± 0.09 vs. 0.72 ± 0.11; p < 0.001) and a significantly lower incidence of perioperative complications (10.5% vs. 24.6%; p = 0.043). Structured pre-anaesthetic review significantly reduces perioperative complications and improves adherence to safety practices among elective surgical patients. This low-cost intervention is a viable strategy for enhancing patient safety in resource-limited healthcare settings.

Keywords: *Pre-Anaesthetic Review; Perioperative Complications; Patient Safety; Randomized Controlled Trial; Nigeria.*

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I. INTRODUCTION

Patient safety is a cornerstone of quality healthcare. The World Health Organization reports that anaesthesia-related adverse events contribute significantly to surgical morbidity and mortality, particularly in low- and middle-income countries (LMICs) [1]. Many of these events are preventable through early identification of comorbidities, risk stratification, and appropriate preoperative optimization—core objectives of a structured pre-anaesthetic review (SPAR) [2, 3].

Pre-anaesthetic review involves a systematic evaluation of patients before surgery to identify and mitigate perioperative risks. Empirical evidence from high-income settings suggests that comprehensive pre-anaesthetic assessments can reduce perioperative complications and improve intraoperative stability [4, 5]. However, in many Nigerian hospitals, preoperative anaesthetic reviews are often brief, informal, and inconsistently implemented due to workforce shortages and resource constraints [6]. This reactive approach may contribute to preventable perioperative complications and unplanned intensive care unit admissions [7].

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Despite growing global evidence supporting SPAR, there is limited high-quality experimental evidence from Nigeria, particularly from northern tertiary hospitals. Most available local studies are observational or retrospective, limiting their ability to establish causality. This study, therefore, aims to address this gap by evaluating the effect of SPAR on perioperative complications among elective surgical patients at Federal Medical Centre, Gusau, using a randomized controlled trial design.

II. MATERIALS AND METHODS

➢ *Study Design and Setting*

A parallel-group randomized controlled trial was conducted at Federal Medical Centre, Gusau, a tertiary healthcare institution in Northwestern Nigeria, between January and February 2026. The study focused on elective surgical procedures, as these allow sufficient time for structured preoperative evaluation.

➢ *Participants and Eligibility*

The target population was adult patients aged 18–80 years scheduled for elective non-cardiac surgery, with at least 72 hours' notice and classified as American Society of Anesthesiologists (ASA) physical status I–III. Patients requiring emergency surgery, those with ASA status IV or higher, or those with significant communication barriers were excluded.

➢ *Sample Size and Randomization*

Using a two-proportion formula with a baseline complication rate of 45% and an anticipated 30% relative reduction, a minimum sample size of 50 participants per group was calculated. Adding 10% for attrition, the final sample was 114 participants, with 57 randomly assigned to the intervention group and 57 to the control group. Stratified block randomization was used, with allocation concealment via opaque sealed envelopes.

➢ *Intervention*

Participants in the intervention group received a structured pre-anaesthetic review conducted by a consultant anaesthetist 24–72 hours prior to surgery. The review followed a standardized checklist that included comprehensive medical history, comorbidity evaluation, airway assessment, ASA risk stratification, and patient counselling.

The control group received routine preoperative evaluation, typically conducted by junior medical officers or anaesthesia trainees. This process was not standardized and did not include a structured checklist or formal patient education.

➢ *Outcome Measures and Data Collection*

The primary outcome was the incidence of perioperative complications, classified using the Clavien-Dindo Classification. A safety adherence score was also developed based on compliance with key perioperative safety processes. Data were collected using standardized forms and analyzed using SPSS version 27. Between-group comparisons were conducted using independent samples t-tests and chi-square tests, with statistical significance set at $p < 0.05$.

➢ *Ethical Considerations*

Ethical approval was obtained from the Federal Medical Centre Gusau Research Ethics Committee (Approval No: FMC/2021/985/008/NHREC/TR/0029/25/11/2025). Written informed consent was obtained from all participants.

III. RESULTS

A total of 120 patients were screened, of whom 114 were randomized and completed the study (57 per group). Baseline characteristics were comparable between groups, with no statistically significant differences ($p > 0.05$). The mean age of participants was 41.4 ± 11.8 years, and 65.8% were female. Most patients were ASA physical status II (52.6%).

➢ *Safety Adherence Scores*

Participants in the intervention group demonstrated significantly higher adherence to perioperative safety protocols compared with the control group (mean score 0.88 ± 0.09 vs. 0.72 ± 0.11; $t = 8.74$, $p < 0.001$). The effect size was very large (Cohen's $d = 1.63$).

➢ *Perioperative Complications*

There was a significant reduction in perioperative complications among patients receiving SPAR (10.5%) compared with those receiving routine care (24.6%) ($\chi^2 = 4.08$, $p = 0.043$). The odds of experiencing a complication were 64% lower in the intervention group (OR = 0.36; 95% CI: 0.13–0.98).

Table 1: Association Between Intervention and Perioperative Complications

Outcome	Intervention (n=57)	Control (n=57)	χ^2	p-value	Odds Ratio (95% CI)
Complication present	6 (10.5%)	14 (24.6%)	4.08	0.043	0.36 (0.13–0.98)
No complication	51 (89.5%)	43 (75.4%)			

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IV. DISCUSSION

This randomized controlled trial provides robust evidence that a structured pre-anaesthetic review significantly reduces perioperative complications and improves adherence to safety protocols among elective surgical patients in a Nigerian tertiary hospital. The magnitude of improvement observed in safety adherence reflects the ability of structured review processes to standardize clinical assessment and minimize omissions in perioperative preparation.

The large effect size (Cohen's d = 1.63) for safety adherence suggests that the intervention produced substantial practical improvements in safety practices, likely due to better documentation, systematic airway assessment, and thorough evaluation of comorbidities. The 64% reduction in the odds of complications further supports the clinical value of integrating structured pre-anaesthetic assessment protocols into routine elective surgical care.

These findings are consistent with global evidence. A multicentre cohort study by Tomczyk et al. [8] reported a 28% reduction in perioperative complications following structured reviews. Similarly, Abubakar et al. [9] in Nigeria found significantly fewer intraoperative events among patients who received SPAR. The consistency of these results across different settings reinforces the universal benefit of structured preoperative assessment.

In resource-constrained environments such as Federal Medical Centre Gusau, SPAR represents a low-cost yet high-impact intervention. The use of standardized checklists, as highlighted by the World Health Organization's Safe Surgery Initiative, is a key strategy for improving surgical safety globally [10]. The present study demonstrates that such an approach can be effectively implemented even in settings with significant resource limitations.

V. LIMITATIONS

The study was conducted at a single centre, which may limit generalizability. Blinding of participants and clinicians was not feasible, which could introduce performance bias. However, the use of objective outcome measures and blinded outcome assessors mitigated this risk.

VI. CONCLUSION

Structured pre-anaesthetic review is an effective strategy for reducing perioperative complications and improving safety adherence among elective surgical patients. These findings support the routine integration of SPAR into perioperative care protocols, particularly in resource-limited settings, as a scalable intervention to enhance patient safety.

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